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ABSTRACT

This instructor's manual and student learning activity guide comprise a kit for a graphic arts activity on offset press operator/duplicating machine. Purpose stated for the activity is to provide the student with an understanding of the basic operation involved in the production of printed matter in the graphic communications industry through the production of letterhead stationery. The instructor's manual contains information on activity duration, lists of goals and instructional objectives, vocational clusters, materials for activity implementation (description, safety, materials required, preparation prior to class, classroom techniques, followup activities), answer key, and duplication masters (occupational fact sheet). The student learning activity guide provides an introduction, a list of goals, directions, a list of required materials, and a programmed text. The programmed text presents each instructional objective, steps to follow to accomplish the objective, and check point instructions. Occupational descriptions are appended. (YLB)

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ED260248

GRAPHIC ARTS - OFFSET PRESS OPERATOR/DUPLICATING MACHINE

TI-422

INSTRUCTOR'S MANUAL

AND

STUDENT LEARNING ACTIVITY GUIDE

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## TITLE OF ACTIVITY

Make letterhead stationery

## DURATION

Main Activity - 7 periods
Pre-Activity - 2 periods
Follow-Up - 1 period

## GOALS

The student will have an understanding of the basic operation involved in the production of printed matter in the graphic communications industry through the production of letterhead stationery.

## INSTRUCTIONAL OBJECTIVES

Each student will choose a heading with the name and address of a parent, friend or teacher and some type of drawing or lines to be printed.

Given proper instructions, each student will identify the tools and materials used in this activity.

The student will be able to distinguish the difference in the six type groups and which would be suitable for his/her stationery.

The student will be able to draw straight, vertical, and horizontal lines one inch apart using a ruler, T-square and triangle.

The student will set lines of type on a typewriter and trace or draw with a pen on a direct image master to produce a letterhead.

The student will operate a printing press to produce 100 sheets of 8 1/2" x 11" paper with an address and a drawing on each sheet.

## ACTIVITY IMPLEMENTATION

The student will use a T-square, ruler, and triangle to draw straight, vertical, and horizontal lines 1" apart. They will be able to distinguish the differences in the six main groups of type by looking through newspapers and magazines and gathering several examples of each group. The student will then cut them out, paste the samples on paper, and name them. The student will apply his/her knowledge of type styles and drawing lines to produce a direct image master. Each student will prepare the master or plate to be put on an offset printing press. The student will operate the printing press (duplication) to produce 100 copies of a letterhead stationery. The student will fill out the Occupational Fact Sheets.

### Safety

1. Always walk in lab areas. Running is dangerous.
2. All trash should be in the proper containers.
3. Scissors should be in their proper location when not in use. Make sure points are always down.

4. Operate the press only after receiving complete instructions and with permission from the instructor. The instructor must be present at the time you use the press.

5. Only one person will operate the press at any time.

6. Always keep your hands away from moving parts of the press.

7. Don't wear loose clothing while operating the press.

8. Don't lean over the press with long hair.

9. Never place a rag on moving press rollers.

10. Don't wear rings and other jewelry around a press.

11. Cleaning solvent is flammable. Never smoke or have an open flame in the area of cleaning solvent.

12. Do not throw rags soaked in cleaning solvent in an open trash can.

13. Be careful when handling paper since it can cut you.

**Expendable Materials**

- Newspaper or magazines
- Rubber cement or glue stick
- 8 1/2" x 11" white bond paper
- 5 1/2" x 8 1/2" white bond paper
- Tape
- Pencil
- Direct image master
- Replex (fountain solution)
- Cotton pads
- Black pen (oil base)
- Ribbon for typewriter
- Rubber base black or color ink
- Cleaning solvent
- Rags
- 8 1/2" x 11" paper (100 sheets per student)
- $H_2O$ (water)
- Clean up attachment or mats

**Necessary Materials**

- Scissors
- T-square
- Triangle
- Ruler
- Ink knife or Putty knife 2" wide
- Offset printing press or mimeograph
- Typewriter (optional)

**Preparation Prior to Class -**

Obtain all expendable materials. Give out scissors, rubber cement, 8 1/2" x 11" paper, and old newspaper to use to obtain type samples. Have students cut samples of type out of the newspaper and glue them on the 8 1/2" x 11" sheet of paper and write the correct name next to the sample.

**During Class Session**

Introduction - This activity is concerned with the printing industry. Practically everything we use in our technological society has printed material related to it. The people in this industry range from executives of large printing companies to designers, printers, and skilled laborers such as press operators. The activity itself is concerned with becoming aware of the six groups of type, using a T-square and triangle, and producing letterhead stationery. You as a designer will determine the type of letterhead that you want to make. You will also produce your letterhead through an orderly, step-by-step process.

1. First day - Introduction to Graphics *Duplicate handout showing careers in graphics. Go over areas with the students and discuss what skills would be helpful in each area.

2. Second day _ Safety and Tools - Read safety rules and discuss why safety is important. Go over tools, their names, how they are used, and what they are used for.

3. Third day - Type styles - six major groups. Show students the difference in each group of type.

4. Fourth day - Using a T-square and triangle to draw horizontal and vertical lines *Give students one T-square, one triangle, about an 8" strip of masking tape, three sheets of 5 1/2" x 8 1/2" white paper, ruler used to draw horizontal lines. Next show them a triangle and how it is used to draw vertical lines. Remind students to complete type groups before starting this assignment.

5. Fifth day - Have students complete drawing lines with a T-square and triangle.

6. Sixth day - Prepare Thumbnail sketches and a Rough Layout for a Letterhead. *Show students samples of stationery. *Give out three sheets of 8 1/2" x 11" paper to each student. Have students prepare four thumbnail sketches. Choose one of the thumbnail sketches to produce a rough layout. The rough layout will be made on a full sheet of 8 1/2" x 11" paper and will be lettered out to show the size and position of type and the drawing of the name and address where it will be printed.

7. Seventh day - Prepare a Direct Image Plate - *Give each student one direct image plate, ball point pen, and use of a typewriter. Have each student draw a design or lines with a ball point pen on the plate. Have the students use a typewriter to type their name and address. The name and address can also be lettered in with a ball point pen if a typewriter is not available.

8. Eighth day - Print a single color Letterhead stationery (make sure the ink can be left on the press overnight), ink knife or putty knife about 2" wide, fountain solution and water, 100 sheets of 8 1/2" x 11" paper for each student, and a cotton pad for each student.

9. Ninth day - Print a single color Letterhead - Have students finish printing their stationery.

10. Tenth day - Follow-Up Activities -
*Give out Occupational Fact Sheets. Ask each student to do at least two sheets concerning printing. Have students locate jobs related to the printing industry in the want ads of a newspaper. Instructor will need to copy VIEW Fact Sheets and provide copies of newspaper want ads.

**Audiovisual Equipment**

None needed

**Technical Equipment**

Optional PICA programs - Type styles and their use

PICA programs - Direct Image Plates

PICA programs - Basic Layout

PICA programs - Offset Printing

Free films - None

**Reference Books -**

*Graphic Communication - McKnight Publishing Company
*Photo Offset Fundamentals - McKnight Publishing Company
*Graphic Reproduction - Chas A. Bennett Company, Inc.
Graphic Arts
*Graphic Arts Technology - Delmar Publishers
Comprehensive Graphic Arts - Dennis and Jenkins Publishing Company
Understanding Graphic Arts - South-Western Publishing Company

* Denotes state-adopted text

## OCCUPATIONAL FACT SHEET

NAME _____ CLASS _____ OCCUPATION _____

**REFERENCE**
Use the South Carolina Occupational Information System (SCOIS) or the alternative references below to help you to answer the questions.

**ALTERNATIVE REFERENCES**
South Carolina State Employment Security Commission
South Carolina State Department of Labor
U.S. Department of Labor
Encyclopedia of Careers and Vocational Guidance
Dictionary of Occupational Titles
U.S. Department of Commerce
Professional and Trade Association
Business and Industrial Firms and Agencies

A. List the advantages (good points) of this occupation (job.)

B. List the disadvantages (bad points) of this occupation (job).

C. List three things you should know how to do in this occupation (job).
1.
2.
3.

D. What type of education should you get to be prepared (do) for this occupation (job)?

E. What courses must you take to go into this occupation (job)?

F. What do you think your future in this occupation (job) will be?

G. What wage can you expect in this occupation (job)?

H. What are the working hours of this occupation (job)?

I. To learn more about this occupation (job), write to:

J. Using a scale of 1 to 5, circle the number that measures your interest in this occupation (job) as a possible career.

I don't like it. 1 2 3 4 5 I like it.
5

# GRAPHIC ARTS - OFFSET PRESS OPERATOR/DUPLICATING MACHINE

TI-622

STUDENT

LEARNING ACTIVITY GUIDE

State Department of Education
Office of Vocational Education
Prevocational Education
Columbia, South Carolina 29201

1985

## INTRODUCTION

This activity is concerned with the printing industry. Many items used in our home and business must be designed and printed. The people involved in the printing process range from printing company executives to technical people like layout designers, typesetters, press operators, and skilled laborers. This activity will carry you through some of these jobs. You will also learn how to use the proper type style for your letterhead stationery and how to use a T-square and triangle to produce straight lines. You as the designer will choose the type, determine the design, and place it.

## GOALS

The students will identify printing problems and the solutions through the production of their own letterhead stationery.

## DIRECTIONS

Follow each step carefully. Be sure to have your instructor initial your student checksheet after each objective has been completed.

## MATERIALS

The materials needed for this activity will be acquired at the beginning of the period.

## STEP 1: GATHER TYPE SAMPLES

Materials and Tools

White bond paper, 8 1/2" x 11"
Old magazines, brochures, or papers
Scissors or knife
Rubber cement or tape

Procedure

1. Gather the materials and tools. Make sure that the magazines can be cut up. **DO NOT** cut up books or magazines from the library.

2. Match the type samples on the next page with ones in a magazine or newspaper. Cut out several examples of each.

3. Tape or glue the samples on a piece of 8 1/2" x 11" paper and write the name next to the sample.

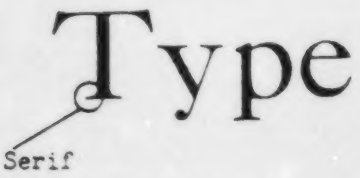
**CHECK POINT**

Show the correct name and address to your instructor. Have your instructor initial your checksheet.

4. **TEXT** or black letter is the first group to consider. This style came from the hand lettering of the early scribes. Notice the heavy strokes. Gather several examples of the Test group, and tape or cement them to a sheet of paper.

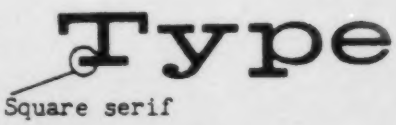
Type

5. **ROMAN** type developed after Text. Roman is easier to read and is most often used in books. Notice that this type face has a "serif" that is easy to recognize. Serifs are the short cross-lines at the ends of the strokes of letters. Gather some examples of Roman type. You will probably notice that the serifs are different on some of your examples. This is because of the many variations in the Roman group.

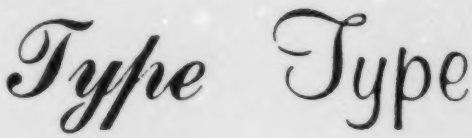



6. **SANS SERIF** is another group that is characterized by uniform strokes and no serifs. Gather several examples of this style.

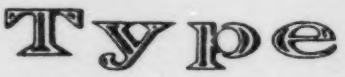
7. **SQUARE SERIF** is also characterized by uniform strokes. This style has serifs that are squared off, unlike the rounded serifs of Roman type. Gather examples of this type.




8. Typestyles that look like handwriting are called **SCRIPTS** and **CURSIVES.** Scripts are connected while Cursives are not. Gather examples of this type.




9. The final group is known as **DECORATIVE.** All type that doesn't fit into any other group falls into this group. Novelty faces are also in this group. These are fancy type faces. Gather several different examples that would fall into this group.

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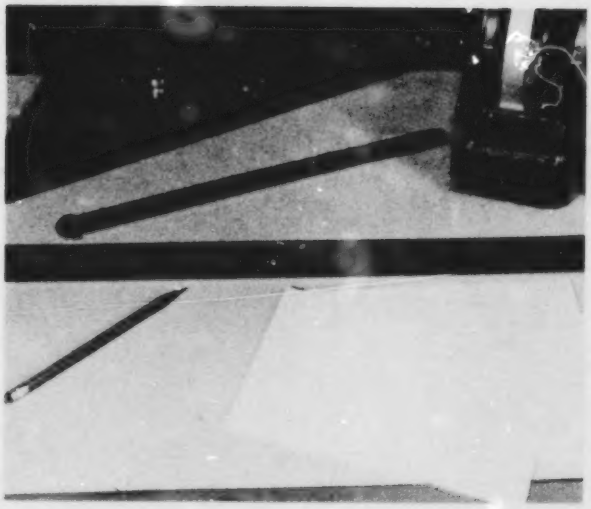
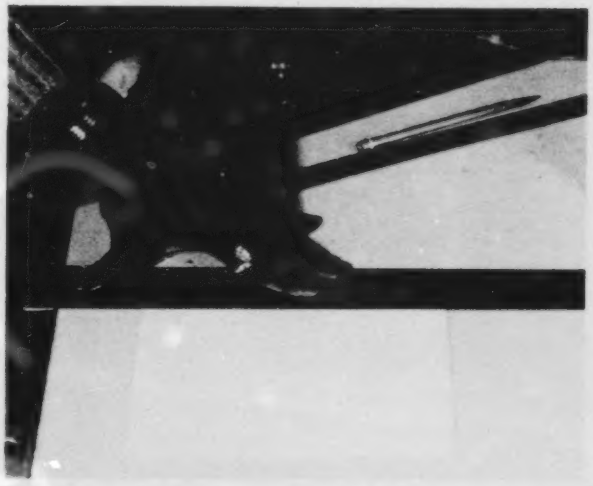
## STEP 2: MOUNTING DRAWING SHEETS ON DRAWING BOARD



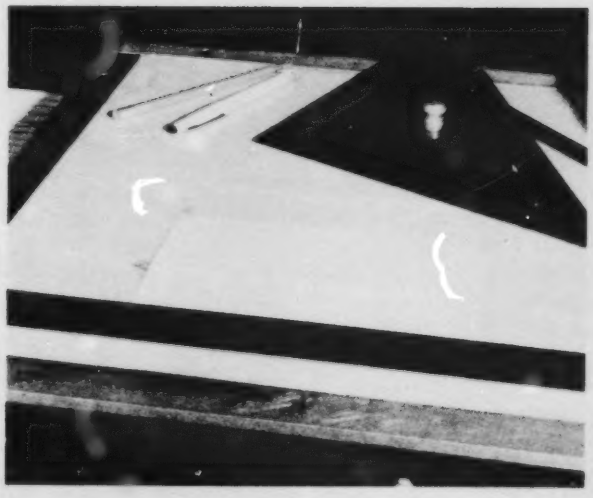
Materials and Tools

Three sheets of 5 1/2" x 8 1/2" white bond paper
T-square
Triangle
Masking tape
Line gauge
Light blue pencils



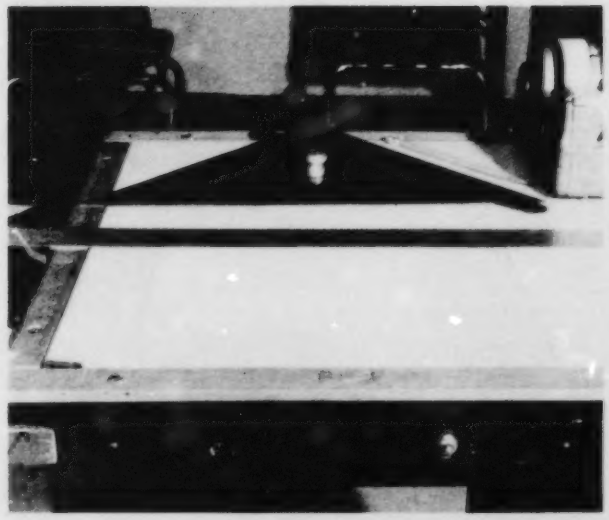
Procedure

1. Place the T-square on the table with the T-head at the left edge. Hold the T-square tight and line up the paper with long side on the T-square.



2. Now line up the bottom of the paper with the T-square and tape the top corners.

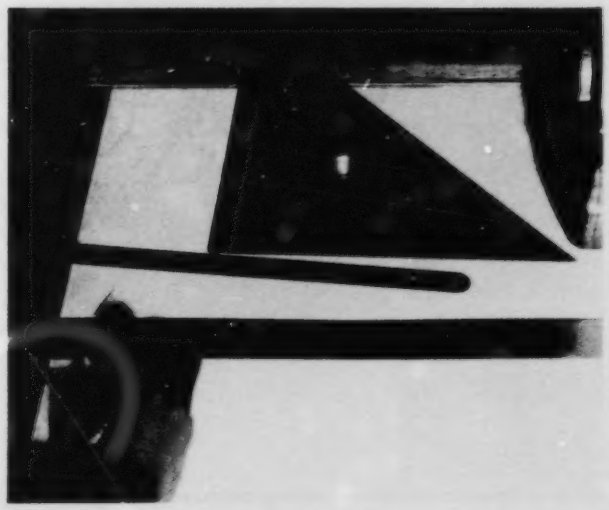
3. Tape the other corners of the paper. Draw horizontal lines.



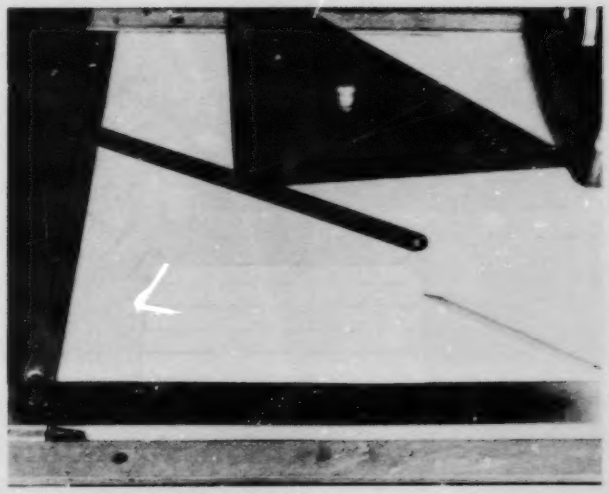
## STEP 3: DRAW HORIZONTAL LINES

Procedure

1. Make sure your pencil is sharp. Hold the pencil at a slight angle with the point against the edge of the T-square as shown. Pull the pencil along the T-square and draw a line. Draw several horizontal lines using this procedure.



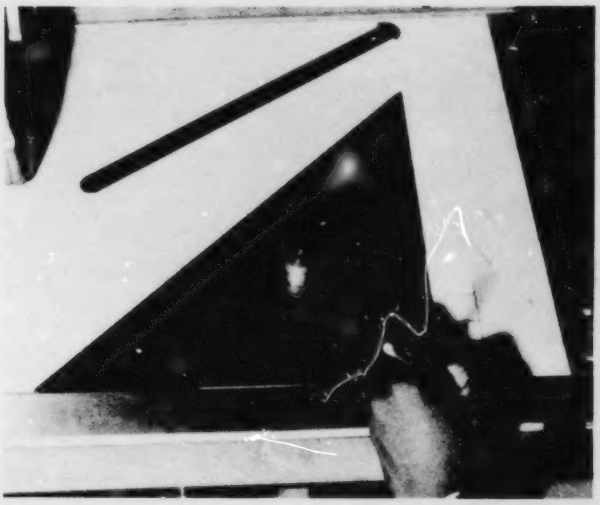
2. When you have done this, check your lines to see if they are parallel. If they are, go to the next step. If they are not parallel, practice using the T-square until you can make parallel lines.

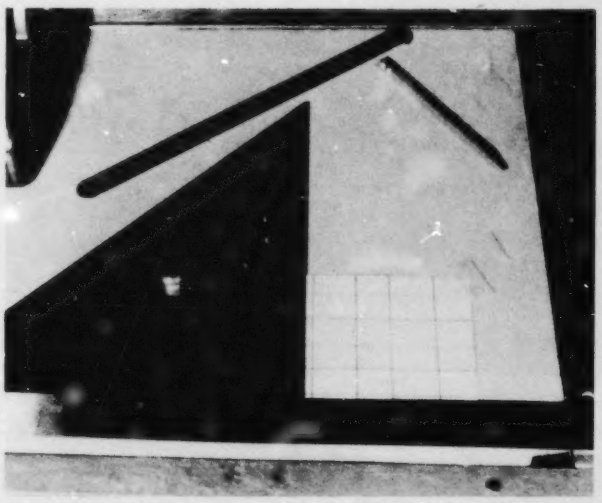


## STEP 4: DRAW VERTICAL LINES

Procedure

1. Hold the T-square tight with your left hand, exerting pressure to the right. Place the triangle against the T-square. Hold both instruments with your left hand. Draw several vertical lines. Hold the triangle tightly while drawing lines.





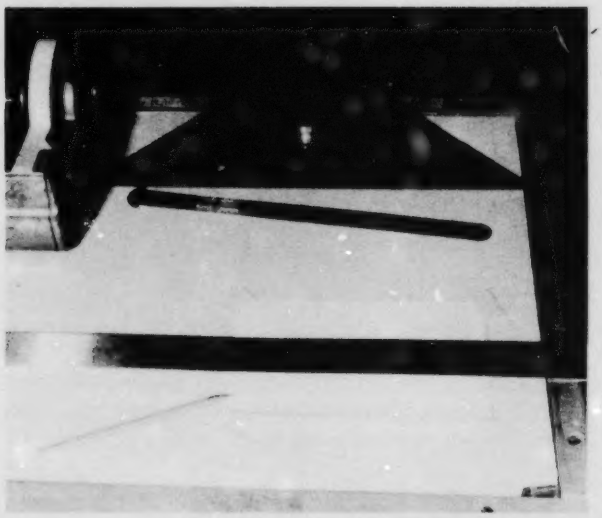
2. When this is done, check the lines to be sure they are parallel. Have your instructor check your work.

3. After you feel confident that you can draw straight lines, tape down a second sheet of paper. Follow the same procedure you used for the first sheet.

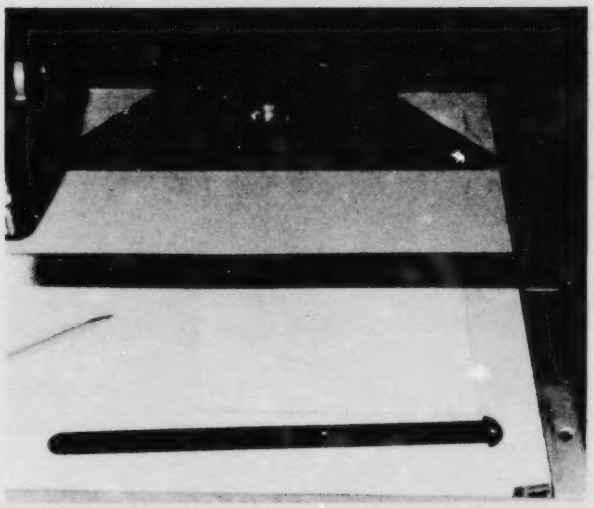
## STEP 5: DRAW A GRID

Procedure

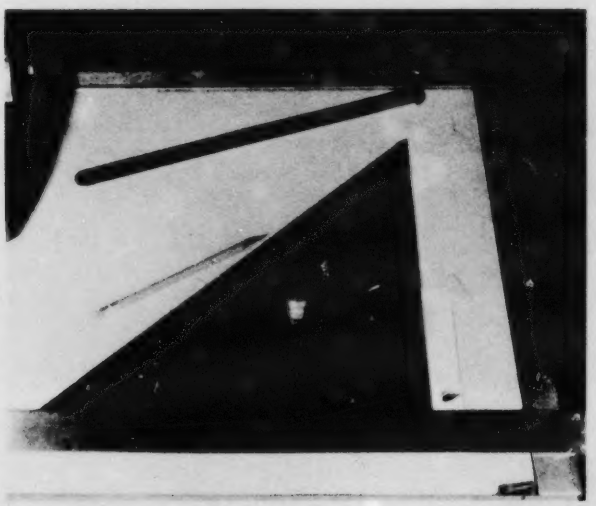
1. Draw a horizontal line near the bottom of the sheet.



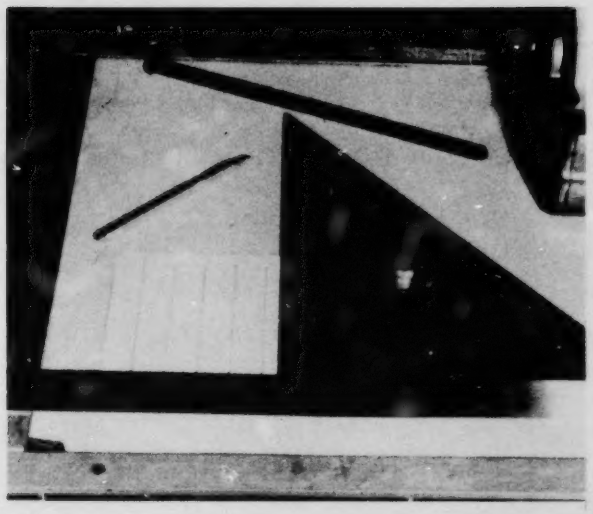
2. With the line gauge (or ruler) make five marks along the line one inch apart?



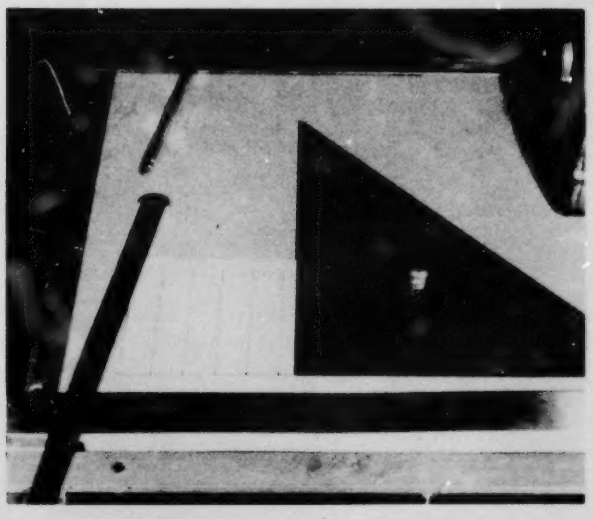
3. Place the pencil point on the first mark and bring the triangle to the pencil. This method assures a more accurate line.



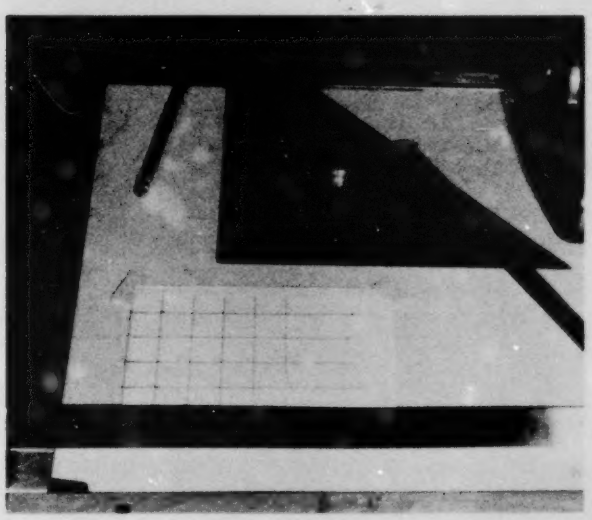
4. Draw vertical lines through each mark. Stop the lines near the top of the paper.



5. Make four marks, one inch apart, on the left vertical line.



6. Using the T-square, draw horizontal lines across the paper through the marks. You should now have a grid of one inch squares. Have the instructor check your work. Your grid should match the grid that your instructor has.



7. If these lines are not straight and parallel, repeat this assignment. Remember, the skills you develop now will help you do a much better job later.

**CHECK POINT**

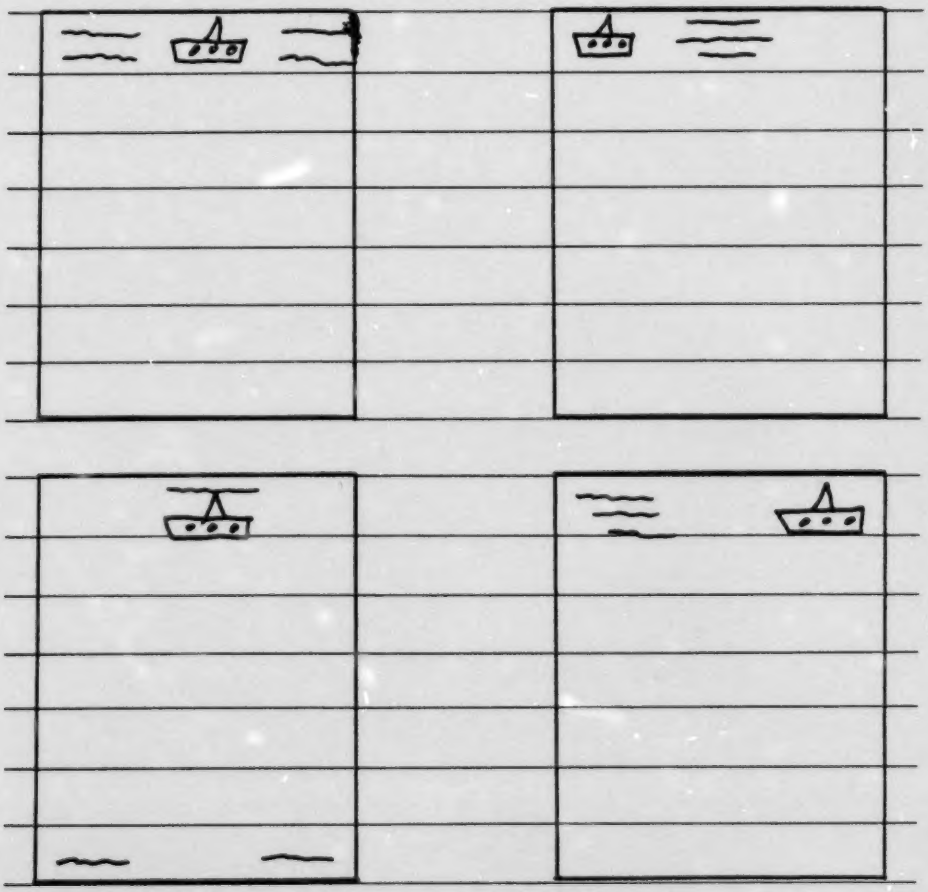
Show the correct name and address to your instructor. Have your instructor initial your checksheet.

## STEP 6: PREPARE THUMBNAIL SKETCHES

Procedure

1. Draw a rough sketch of a few ideas you have for your letterhead. This is called making thumbnail sketches. Move the name and address around and play with your ideas.

2. Now pick the sketch you like the most. Draw it out on a full size sheet of 8 1/2" x 11" paper. This finished product is called a rough layout.



## STEP 7: PREPARE A ROUGH LAYOUT

Materials and Tools

Layout paper, 8 1/2" x 11"
Drawing board or light table
T-square
Triangle
Pencils
Masking tape

Procedure

1. Look at your thumbnail sketches. Choose one that you would like to print as a single color job.

2. Tape a sheet of layout paper on the drawing board. Use your T-square to line up the paper squarely.

3. The rough layout is drawn to the full size of the finished job. All elements of the finished job are located in their proper position and size.

4. Letter headlines to look like the finished type.

5. Make rough sketches of illustrations. Place them where they will appear on the finished job.

6. Remember this layout should look as close to the finished job as possible. On some jobs, this will be the final stage of layout. You may need to make more than one rough layout. Experiment to see what you like best.

## STEP 8: PREPARE MASTER

Materials and Tools

Direct image plate typewriter
with carbon ribbon
Reproducing pencil
Non-reproducing pencil

Procedure

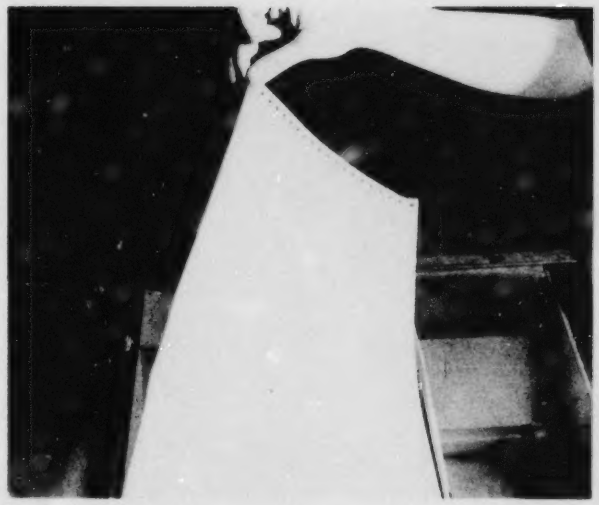
1. Use a non-reproducing pencil to lightly draw in guidelines. Your master may already have preprinted guidelines.

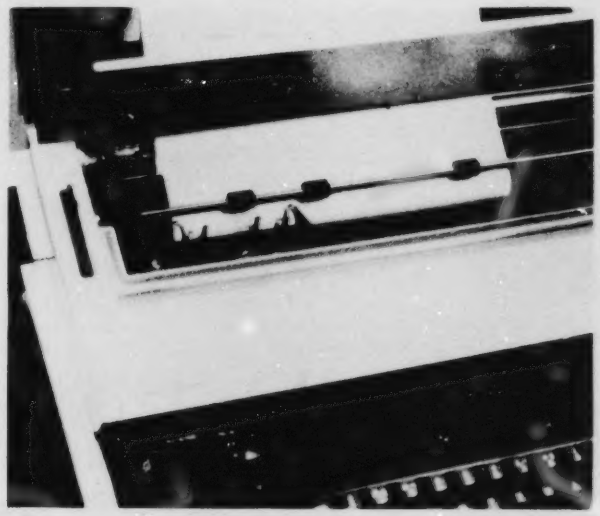
2. Handle the master by the edges. All fingerprints in the image area (the part that is going to be the stationery) will print.

3. Insert the master into the typewriter. Make sure you hold it in the gripper margin. Set the typewriter for a light impression. Make sure you type inside of the guidelines for the size sheet you will print on. Follow the layout. Type with extra care.

4. If you make a mistake, lightly erase. You only want to take the carbon off of the master. Type in the correction after you make the erasure.

5. Take the master out of the typewriter and draw your design with a reproducing pencil. Remember: Do not touch the master with your hands. You are now ready to print.





**CHECK POINT**

Have your instructor check the master.

## STEP 9: PRINT LETTERHEAD STATIONERY

Materials and Tools

Plate
Cotton wipes
Fountain solution
Ink and ink knife
Paper
Cleanup mats
Press wash

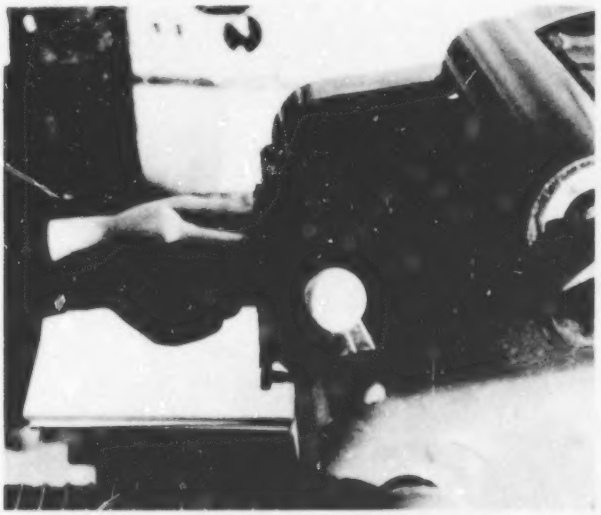
Procedure

1. Get other necessary materials and take them to the press area. Make sure you do not wear loose clothing that could get caught in the press.

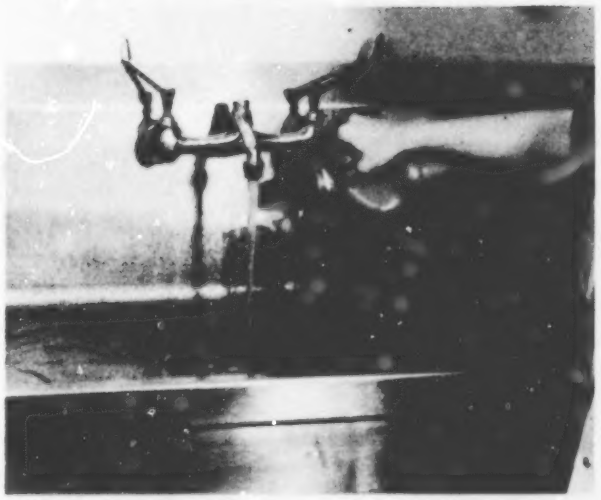
2. Place the amount of ink in the ink well as your instructor directs.

3. Turn on the press and allow the inking system to ink up.

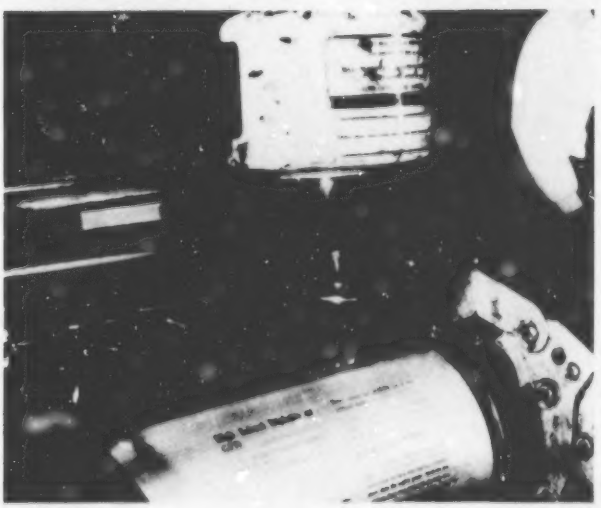
4. Adjust the ink well keys for even ink distribution.



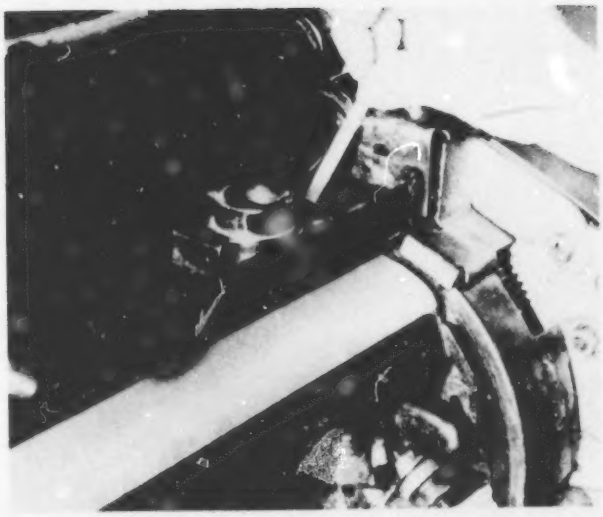
5. Mix fountain solution 15 parts water to 1 part fountain solution.



6. Place mixture in water holder.

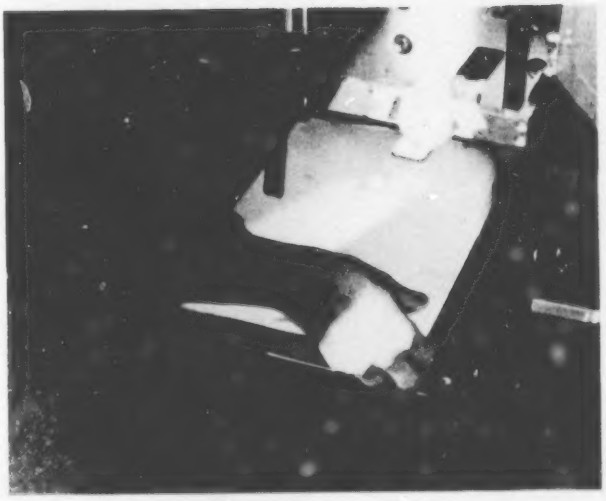


7. Turn the press off and add fountain solution to the press. Check the fountain with pH paper. It should be 4.5.

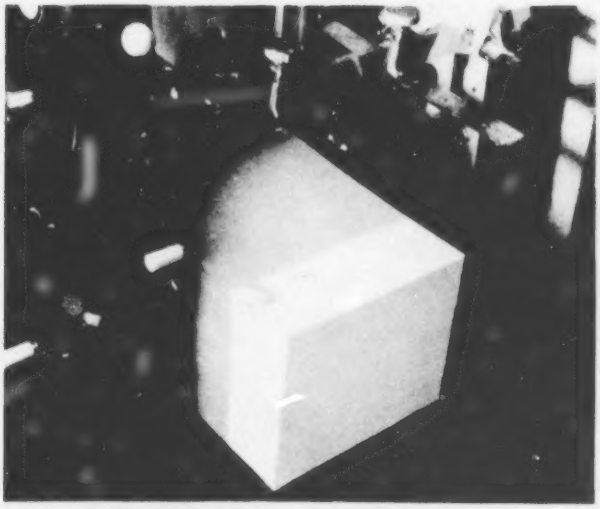


8. Jog the paper. This is a very important step to be sure you don't skip it.

9. Set the feed table to the size paper you are using.

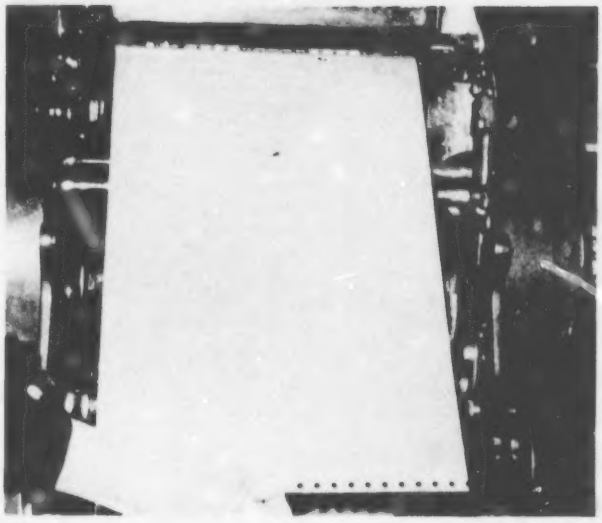


10. Place the paper on the feed table.

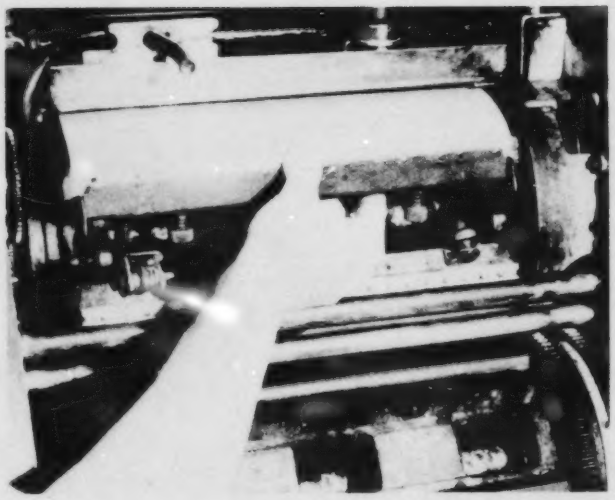


11. Make all necessary adjustments to the feeder system of the press.

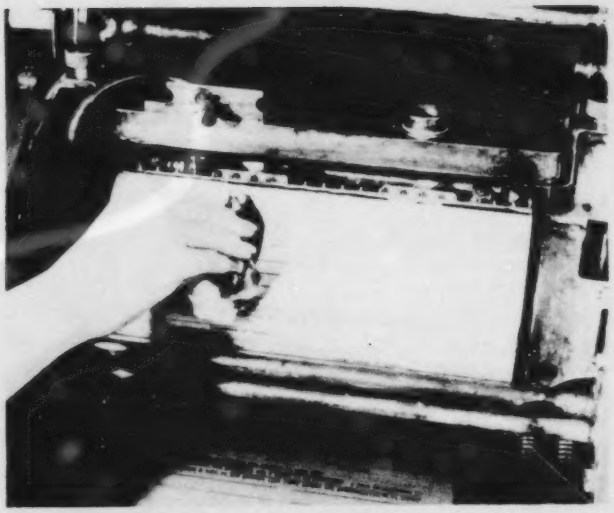
12. Attach the lead edge of the master to the plate gripper. Hold the master tight and rotate the cylinder. Attach the trailing edge of the master.



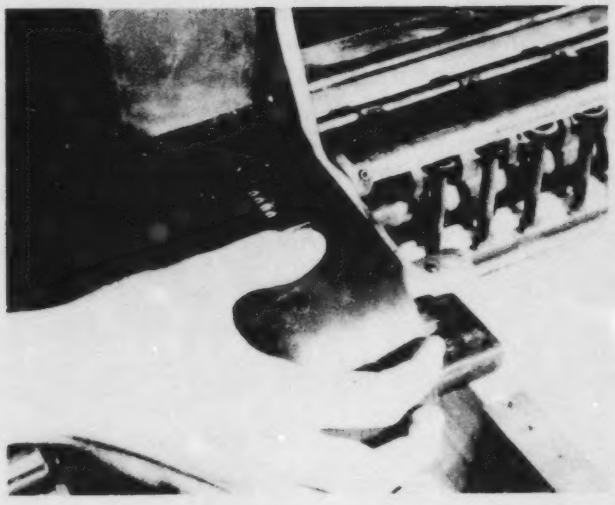
13. Attach the trailing edge of the master to the plate clamp.



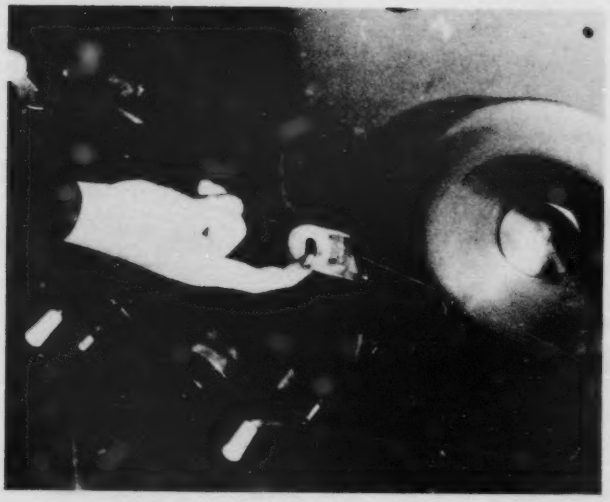
14. Wipe the plate with straight, undiluted fountain concentrate.



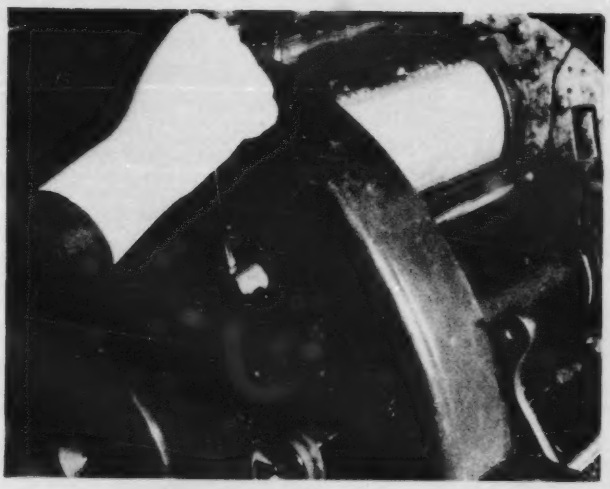
15. Set counter to zero.



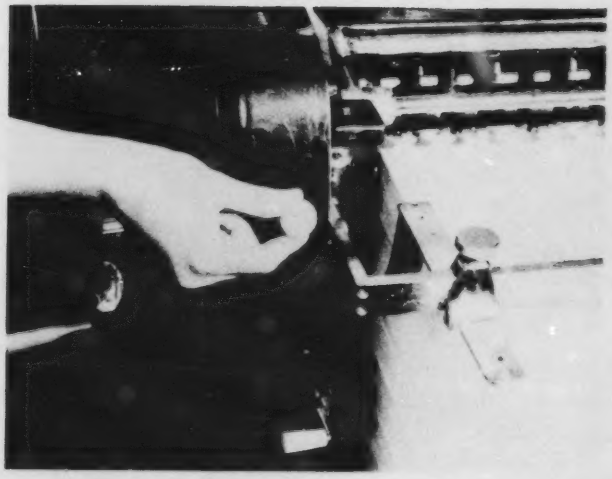
16. Turn on the press and ink up the plate.



17. Make an impression on the blanket.



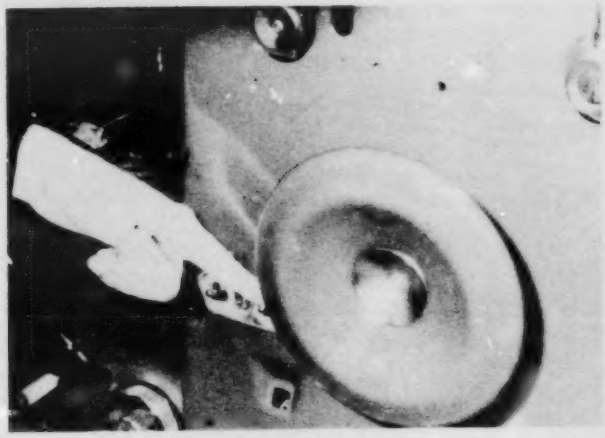
18. Turn on the vacuum and print a few sheets.



19. Check the printed sheets for correct position on the sheet according to the layout. Check for good even color.

20. Make any adjustments necessary. Print the job. When you are through printing, take the printed stack out of the delivery tray. Do not squeeze the stack. Set it aside.

21. Turn off the press.



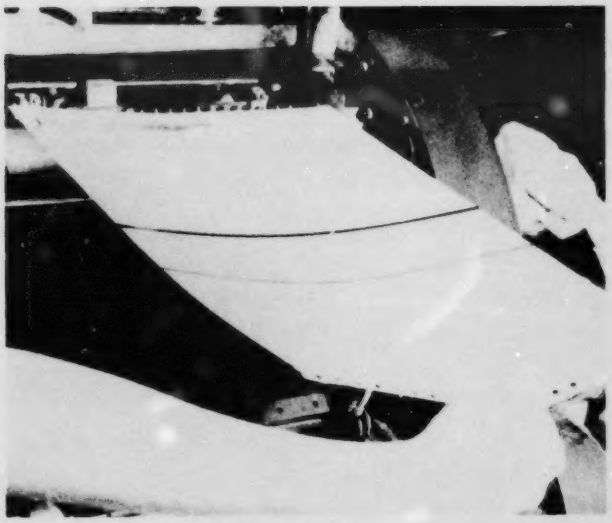
**CHECK POINT**

Show the correct name and address to your instructor. Have your instructor initial your checksheet.

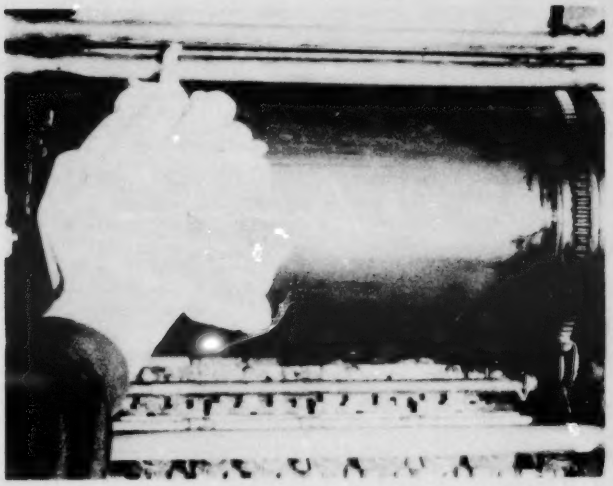
**Step 10: CLEAN OFFSET PRESS**

Procedure

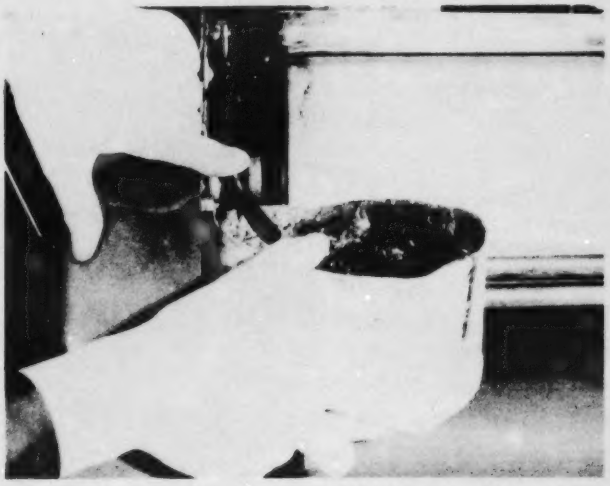
1. Take off the plate in the reverse order that it was put on.



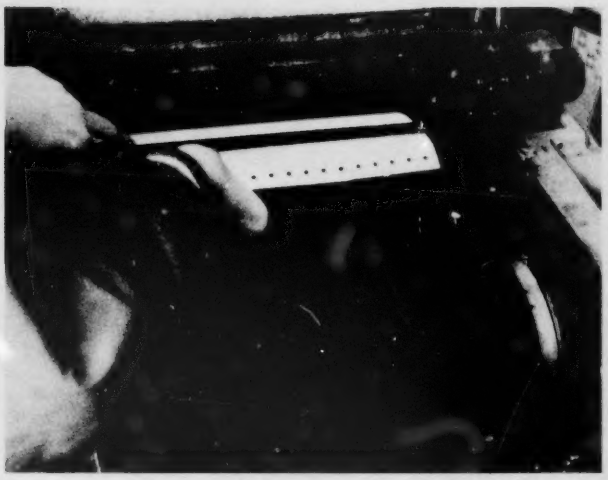
2. Clean the blanket with cleaning solvent and a rag.



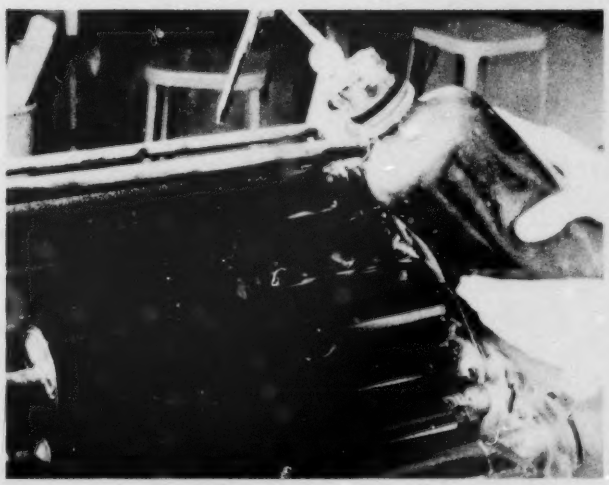
3. If no one else is going to operate the press, drain the water out of the fountain.



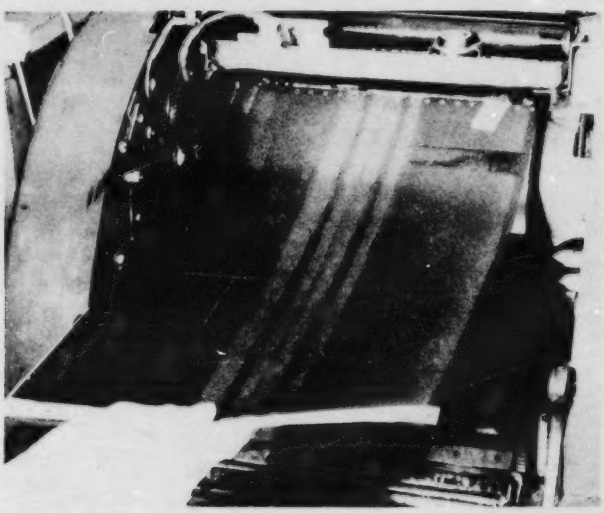
4. Attach a clean-up sheet the same way you put the plate on.



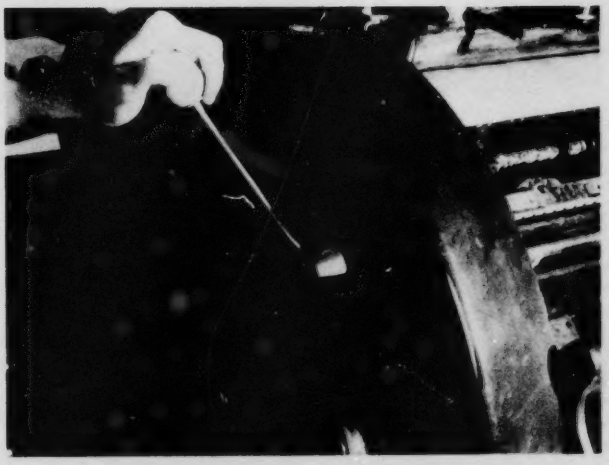
5. Clean the press as directed by your instructor. Put press wash on only one side of the rollers at a time.



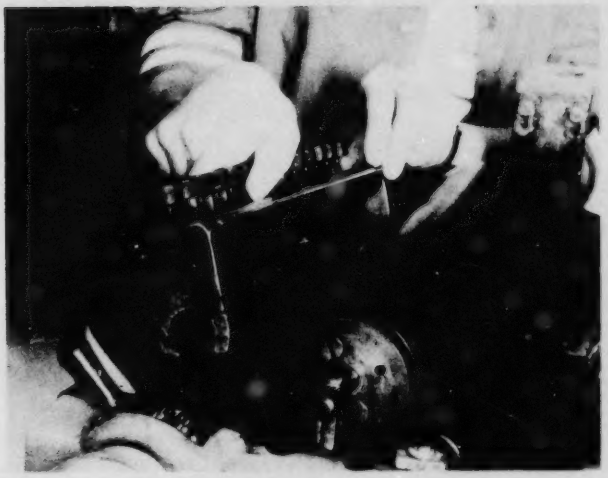
6. After the clean-up sheet is covered in ink, remove it the same way you took the plate off. You will probably need to do this about three or four times.



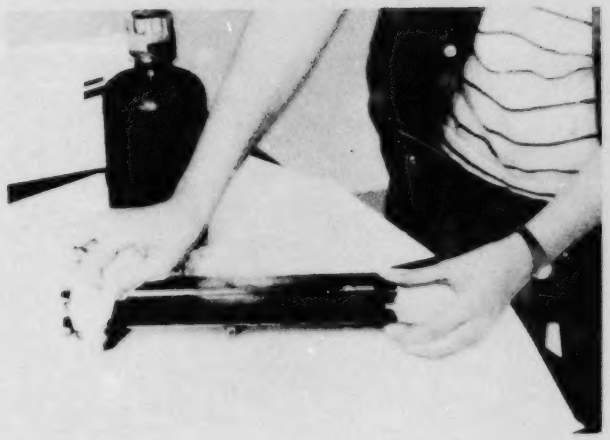
7. Turn the press off and angle lever to night latch.



8. Take ink fountain off by turning it straight up and then lifting.



9. Clean ink fountain thoroughly with rag and cleaning solvent. Place it back on the press.



**CHECK POINT**

Show the correct name and address to your instructor. Have your instructor initial your checksheet.

## OPERATIONAL INSTRUCTION FOR MIMEOGRAPH MACHINE

As an alternative, schools without an offset machine can use a duplicating/mimeograph machine to print and produce the final product. The operation procedures may vary according to the model of the duplicating/mimeograph machine. It recommends that the operator follow the instruction provided for a particular model. However, the general procedure for operating a duplicating machine are as follows:

1. **Counter Dial.** Sets machine for copies desired. Dial counterclockwise nearest multiple of 10, then additional single copies. To begin run, lift operating lever. Machine stops automatically after running selected number up to 200.

2. **Pressure Knob.** Rotation starts motor, fluid flow, and sets copy pressure. Average setting, "3". For long runs, start lower and increase gradually as copies become lighter.

3. **Registration Adjustment.** Push in to release, slide toward "Raise" to move print up on copy, toward "Lower" to drop print.

4. **Operating Lever.** Press down for single copy. Lift up for multiple copies. To stop machine during a continuous run, return lever to neutral position.

5. **Loading Tray.** Press down on side guide. Now push stack of paper under feed roll against front baffle. Stack should not be higher than sheets of 20# paper or equivalent). Move self centering guides against stack.

6. **Master Attaching.** 1/4" top attaching margin required. Hold master as shown with carbon surface inside.

7. **Handling Small Forms.** Feed tray will handle virtually any weight paper or card stock in sizes 8 1/2" x 11" and 8 1/2" x 14". For smaller sizes place about 150 sheets on tray.

8. **Hand Feeding.** Remove feed roll shaft by pushing shaft toward rear wall and lifting out. Now 1/4" stack of any size or weight of paper can be easily fed by forwarding top sheet into bite of rollers.

9. **Receiving Tray.** Tray slides in for short forms, out for long. Calibrated at usual 11" and 14" sizes.

   Set number on tray opposite black plastic guide.

   Paper stackers stack sheets neatly without adjustment, regardless of paper weight or size.

10. **Fluid System.** Fluid is pumped directly from the gallon shipping container which may be placed on the floor or in a cabinet. The pump automatically starts fluid flow when the pressure knob is turned on. Within a few seconds the wick is moistened properly for duplicating.

**Note:** Because of the flammable solvents contained in all duplicating fluids the machine should be placed in an area where there is adequate ventilation.

**Caution:** Do not use fluid near fire or flame.

## MAINTENANCE

11. **Wick and Wick Tank Maintenance.** Clean paper lint from wick regularly to avoid streaky copies.
To inspect wick, lift cover by handle.
For longer life, turn wick occasionally to a new edge.

12. **Cleaning Pressure Roll and Drum.** When pressure knob is turned to "Off," pressure roll may be lifted out. Pull from an off center position. Clean roll with cloth moistened with duplicating fluid. Clean drum by lifting operating Lever to "Multiple" position and rotating by hand as you clean.
**CAUTION:** When cleaning be sure motor is turned off.

13. **Cleaning or Replacing Automatic Feed Roll.** To clean, occasionally wrap Scotch Tape around feeding surface and pull off. This removes dirt and lint.
To replace Roll, remove feed shaft (as described in item 8) and screw holding roll assembly. Replace complete assembly.

## OPERATING TIPS

**Master Preparation.** Masters can be prepared using a typewriter, ball point pen, hard pencil, infra-red copying machine, or printing press. When using a typewriter make sure type is clear. For ball point pens or hard pencil use a firm even pressure and preferably on a hard smooth surface. Be sure to remove interleave sheet from master unit before typing or writing and allow a 1/4" minimum blank margin at the top or bottom for attaching to the drum of the machine. A master can be prepared using 5 different colors of carbon -- purple, red, green, blue and black -- by simply inserting the proper color behind the master for the color desired. When the master is completed all colors used will duplicate simultaneously.

**How to Make Corrections.** Corrections on masters are made without removing paper from typewriter. Using a knife blade, gently scrape duplicating carbon from area to be corrected. Now coat area with Standard Correction Pencil. Type correction right over crayon coating. Important: To assure full-bodied coating of carbon, hold small piece of fresh carbon temporarily in position while striking in correction.

**Pressure Control for Long Runs.** Pressure determines copy density: high setting, brilliant copies, shorter runs, lower pressures, lighter copies, longer runs. For maximum run, start pressure at "1," then increase gradually, adding pressure as copies tend to get lighter, until you are at maximum pressure and master finally becomes exhausted. The number of satisfactory copies depends on the standard you set for degree of brightness. As manufacturers, we say 200 to 300. However, some users find they can run, using controlled pressure, almost 1000 acceptable copies, depending on the grade of duplicating carbon.

## TROUBLE SHOOTING

**Motor does not run**

Check to be sure machine is plugged into electrical outlet.

**Fluid does not pump**

Make sure there is fluid in container. Raise fluid can above feed tray until fluid can be seen in sight glass.

**Light or Streaky copies**

Wipe paper lint from edge of wick. Clean lint from moistening roller. Replace wick if necessary.

**Paper misfeeds**

Remove paper lint from feed roll by using scotch tape or cleaning with fingers. Invert stack of paper. Replace feed roll assembly if necessary.

**Poor paper stacking in Receiving Tray**

Make sure tray is set at proper length. Place small piece of card stock in drum blockout slot to force copy off drum and under stackers.